

THE COMMON BUTTERFLIES OF THE PLAINS
OF INDIA.

(INCLUDING THOSE MET WITH IN THE HILL STATIONS
OF THE BOMBAY PRESIDENCY.)

BY

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(Continued from page 793 of Vol. XXVII.)

PART XIX.

(With 3 text figures).

Family—*HESPERIIDÆ*—continued.

Subfamily (1) *CELÆNORRHINÆ*.

Imago.—The butterflies are of various sizes, mostly with large, white or yellowish, translucent spots on the fore wings, the underside of the hind wing often suffused with white, bluish-white or yellow or spotted profusely with little dots; the hind wings also sometimes with the outer margin sinuate or angled. Swinhoe gives the following:—

Antennæ.—Club of moderate thickness, often recurved, bent at right angles to the shaft in *Charmion*, *Daimio*, *Tagiades*, *Caprona* and *Odontoptilum*; hooked in *Satarupa*, *Odina*, *Tapena*, *Darpa*.

Palpi.—Porrect; third joint short, conical, often minute.

Hind tibiæ.—With two pairs of spurs.

Fore wing.—Vein 12 ending before end of cell usually; discocellulars oblique or suberect; vein 3 from near end of cell, 2 from before middle of cell, usually about one-fourth from base of wing; cell less than two-thirds the length of wing; no costal fold.

Hind wing.—The discocellulars and vein 5 usually very faint."

Egg.—This is dome-shaped; sometimes slightly elongated, always ribbed longitudinally but the number of ribs very variable even in one genus; sometimes (*Tagiades*, *Odontoptilum*, *Abaratha*) covered with hairs and scales from the end of the abdomen of butterfly; variable in colour. Size medium-large for the butterflies.

Larva.—Of two types; one with a very large, deeply bilobed head widest across vertex; the other with a comparatively smaller, bilobed, rounded head. All feed upon dicotyledonous plants and are white (in *Tapena*), green or brown, never coloured; some have a distinct white collar behind the head; all except *Tapena* are covered with minute, star-topped hairs.

Pupa.—Stoutish; a short snout to frons of head between the eyes; a prominent spiracular expansion to spiracle of segment 2 (wanting in that of *Tapena*); the proboscis produced beyond ends of wings at least as far as hinder margin of segment 8, often to 11 (again excepting *Tapena*). The colour uniform (*Celænorrhinus*, *Tapena*, &c.) or variegated with black spots (*Abaratha*, *Odontoptilum*); green: brown.

Habits.—All the butterflies rest with their wings horizontally outspread, the surface generally quite even but in *Tapena* and *Odontoptilum* it is slightly convex and bent down at ends; they are never held erect over the back at any time except when being dried after emergence from the pupa. They rest either on the undersides of leaves, rocks, boulders (*Celænorrhinus*, *Daimio*, *Tagiades*, &c.), or somewhat indifferently on uppersides and undersides—although at

night apparently all of them take up the latter position. They all have a rapid enough flight but do not, as a rule, fly any distance at a time and have the habit of returning again and again to the same place of rest if disturbed, or even ordinarily after taking a seemingly aimless flight. They all go to flowers and all frequent jungly, shady places: *Sarangesa*, *Coladenia*, *Abaratha*, *Odontoptilum* bask sometimes in the sunlight—probably why they rest often on the *tops* of leaves—while the others never seem to do so. The eggs are laid on the top of a leaf and always one at a time. The little larvæ that emerge therefrom always make a little cell by turning over a small triangular or roundish or oblong piece, cut from the edge or in the middle of the leaf, on to the top, leaving a small hinge; this “lid” is fixed down round the edges, the inside is coated with a carpet of silk that has the effect of making it concave by contraction and upon this bed they take up their abode until too large for it. Then a new cell is made. The larva lies with its back to the leaf-surface and invariably with its head turned round on its side when resting. It pupates in the cell it last occupies often enough, but frequently goes off and makes a specially well-constructed one somewhere else.

Genus 1.—CELÆNORRHINUS.

In *Lepidoptera indica*, vol. x, p. 2, Colonel Swinhoe gives the following diagnosis of this genus:—

“*Antennæ*.—Club moderately thick, short, recurved at apex.

Hind tibiæ.—With two pairs of spurs in the male; with a tuft of hairs attached near the proximal end.

Fore wing.—Vein 12 ends on costa at about opposite the end of cell; discocellulars suberect, the upper minute, the lower longer than the middle; vein 6 emitted from the junction of the upper and middle discocellular, 5 from that of the middle and lower; 3 from one-sixth before end of cell, 2 from one-fourth from base; the cell less than two-thirds the length of the costa; costa slightly and evenly arched; apex subacute; outer margin convex; in some species it is nearly as long as the hinder margin which is nearly straight but in many species the outer margin is shorter, making the wing proportionately longer; hinder angle obtuse.

Hind wing.—Vein 7 from one-fifth before upper end of cell; discocellulars faint, erect; 5 hardly visible; 3 from close to lower end of cell; 2 from about one-third before end; apex of the wing rounded, outer margin sinuous but fairly rounded.”

Egg.—Dome-shaped; shining, with 47 or 48 fine, low, minutely-beaded meridional ridges or ribs from base to about half way to top. Colour greenish-white.

Larva.—Moderately stout, fattest about middle, somewhat before it, with the head large, black, deeply, broadly bilobed; the colour olive-green with thin skin; a dorsolateral and spiracular, thin longitudinal line; the whole larva depressed-looking; the minute hairs all star-topped or branched.

Pupa.—Some shade of dark red-brown, stoutest in middle, pointed at anal end (cremaster), the frons with a prominent, rounded-conical process; the proboscis produced free beyond wings as far at least as cremaster; spiracles of segment 2 with prominent ear-shaped or semicircular expansions.

Habits.—The butterfly rests with wings horizontally flat-outspread and always on the undersides of leaves, rocks, boulders, &c. Flight rapid, very quick, somewhat erratic, not sustained; returning to resting

place in the underwood. Colour of wings some shade of brown, generally dark ; fore wing nearly always with a broad, transverse band of white or yellow, large, hyaline spots on the disc. Hind wings variegated with many smallish white or yellow spots, rarely immaculate. Eggs mostly laid on tops of leaf, always single. Larva makes a cell of a triangular piece cut out of the leaf, generally from edge, turned over on the top, densely coated with silk on the—then, when thus turned over—underside which, by contraction of silks, becomes concave. It lies on this, "lid", which it fixes down, with its back to leaf surface its head turned round on its side. Continues this mode of life until end, making new and larger cells as it grows ; sometimes pupating in the last made ; at other times between two leaves. Feeds always upon *Acanthaceæ*. The pupa is attached strongly by the tail and a loose body-band, attached by the middle to the roof of the cell by a single thread or rope ; the fixings of the cover of the cell are slight ; the pupa lies normally, not back downwards like the larva.

198. *Celænorrhinus ambareesa*, (Moore).—Pl. N. Figs. 85 ♂, 85a ♀.—Male. *Upperside*: dark olive-brown tinged with ochreous, fading to a much lighter shade with age; the basal areas of both wings with ochreous and brown hairs extending on to disc of hind wing where they are long along inner edge of abdominal groove, much shorter along the inner margins of both wings, with the cilia chequered brown and ochreous-white. Fore wing with three conjoined, subapical, semihyaline white spots from near costa in interspaces 6, 7, 8, larger than usual in a slight curve outwards, with two more further out in interspaces 5, 6 ; a discal band consisting of a large quadrate spot excavated on its outer side in outer part of cell ; another somewhat similar spot below it in interspace 2, its upper inner end below middle of the other ; a small spot between the two, outside them in interspace 3 and an ochreous one on costa above first : a small ochreous spot below vein 2 just at its origin, a second below it at outer angle of large one of interspace 2 and a third slightly inwards immediately below last in interspace 1 ; a submarginal series of disconnected, short, sometimes very inconspicuous, ochreous, lunular spots. Hind wing with three rows of ochreous spots, the inner spots of the basal row hidden by hairs. *Underside* : paler, the markings similar. Antennæ with the basal third of the club ochreous continued on to the upper part of shaft below, and the shafts spotted with ochreous spots on dorsal surface. Palpi white-ochreous along outer side, the colour continued round the eye to bottom of basal tuft of antenna ; head and body above and below concolorous with wings ; abdomen below with thin ochreous-white segmental bands.—Female. Like the male but with the antennæ perhaps less conspicuously marked. Expanse : up to 50mm.

The species is figured on coloured plate N, figures 85 and 85a, male and female respectively. The representations are not bad but the female is perhaps a little bit too light in colour as compared to the male.

Egg.—There is little difference between the egg of this species and that of the others ; there are some 56 meridians of the same style. It is laid generally on the upperside of leaves in open situations with full access to the sunlight.

Larva.—The egg-larva is black with a black head that already has slight lobes and it is shining all over. The black colour remains until the last stage practically as does the shining surface. The last stage is dull chocolate-brown ; the *shape* is exactly the same as that of the others of the genus ; the head large and divided into two widely, triangularly-separated, conical lobes ; the ventrum is always flattened from the habit the larva has of sitting close-pressed to the surface ; the prolegs and anal claspers are short with the shanks coloured like the

body, the ancles short and rounded, subtended by a double fringe of stiff, white hairs, the feet one-lobed and rather straight, dusky and immaculate, like the ancles; the true legs are rather short, shining rusty-brown; the anal flap is large, flat, semielliptical, well outreaching the bases of anal claspers, fringed round the edge with some simple, 0.15 mm long, whitish hairs as well as, further forward, with the tiny star-shaped ones that cover the body; this flap is also somewhat slightly thickened all round the edge and a little constricted at front margin laterally: it is really rather more semicircular otherwise than semielliptical; segment 13 is about one-quarter the length of 14 and one-third the length of 12; segments 11 and 10 are a bit longer but 9 to practically 3 or 4 are about the same length as 12; segment 2 is shorter and shining-orange looking, brownish-orange and somewhat tumid across middle like a collar behind the large head which measures 4.5 mm in width in the middle, narrowing downwards somewhat but very little upwards, about as high as broad, the vertex-sinus dividing it into two lobes, triangular and about one-seventh as deep as the total height, the lobes being conical and blunt-topped; the surface of the head is rugose in a longitudinally-corrugated manner, the corrugations rather irregular-coalescent and there are also fairly numerous, appressed, tiny, white, thickened hairs hardly 0.05 mm long; the colour of the head is nearly black, a very dusky, shining, reddish-brown; the true clypeus is triangular, equal-sided, the apex the tiniest bit rounded, the height equal to a little less than half the head; the false clypeus is shaped like a gothic window, a thin strip at base outside the other, widely arched over its apex but only reaching slightly beyond half height of the head, the apex acute, not rounded; labrum transverse, small, only a quarter as long as true clypeus, slightly curved; ligula as long as labrum, twice as broad as it is long, transversely oblong, the sinus very shallow, triangular and wide, the colour black while the colour of the labrum is more dusky than black; basal antennal joint dusky, third rusty; mandibles black, large, of the block-type and with the cutting edges quite entire; the eyes are arranged 1 to 4 in a very slight curve, all equispaced, coequal in size, the distance separating them hardly an eye-diameter, number 6 more than three times as far from 4 and in a straight line with 3, 4, number 5 behind making a more or less equilateral triangle with 4 and 6; all the eyes are deep-brown or black. *Surface* with the segments well defined, the usual five transverse folds on the hinder half of each, the dorsum of the anal flap somewhat uneven; the whole body covered, rather sparsely really, with tiny, pure white stars of 0.05 mm in diameter; these are really tiny translucent hair-stems broadening out into a little cup at top and the edge of the cup set with eight tiny hairs; these star-hairs are considerably longer along the dorsoventral margin. *Spiracles* oval, slightly prominent, light orange, about ten to a segment-length, those of segment 12 slightly larger, those of segment 2 very much larger, rather less in length than twice the breadth. *Colour* uniform, rather-dusky chocolate-brown all over except on segment 2 which has a shining-orange collar and the shanks of prolegs which are shining-brown; the rest dull, all sprinkled over with the minute white dots due to the star-hairs, even to the anal flap but not on collar of segment 2; the star-hairs are about 0.1 mm apart; about, that is, two of their own diameters. L: 30 mm when really stretched; B: 6 mm at middle.

When these larvæ become absolutely full-fed the colour changes to an olive-green, rather dull with a slight, very slight, rosey tinge about segments 2 and 3 and a darkish, pulsating band or line dorsally the whole length from segment 6 to 12. The L: still 30 mm; the B: nearer 7 mm. There were still larvæ going on the 8-12-1922 from egg-larvæ obtained at Gudehalli in the beginning of October, about the 9th to 12th of that month. Some larvæ that had been obtained then that were well grown, have turned and produced butterflies, the first having emerged on the 30th of November. So it is a slow-growing species.

Pupa.—This is stoutish although gracefully lengthened, somewhat club-shaped, claviform, in shape, if it were not for the shortish and squarish head-piece made by the prominent eyes with a slightly conically produced head-frons between

them surmounted by a low, knob-like, somewhat upturned snout or protuberance; the shoulders are somewhat unusually, although only slightly and quite smoothly, prominent and there is a slight and somewhat wide constriction laterally of the lateral outline from segment 4 to segment 6; the thorax is very distinctly humped, prominent, smoothly-convex; the anal end pointed, the proboscis produced free to nearly the end of the cremaster beyond the wings; the cremaster itself long and bent down evenly; the ventral outline gently convex; the cremaster is easily twice as long as segment 12 if not slightly more, with a short broad-conical base (its anterior portion) elongated into a longer, more or less oblong piece that is bent down, furrowed strongly in the dorsal line, this furrow being continued on to the anterior, conical portion, this anterior portion separated from segment 13 by a transverse, deep furrow also, the surface of the cremaster roughened conspicuously, its extremity truncated narrowly and bearing a bunch of short, packed suspensory hooklets, its ventral portion solid; ventrally segment 14 is more extensive and is composed of the large, somewhat prominent clasper-scars which extend forwards, compressing segment 13 into a very narrow, transverse band; segment 13 is dorsally much longer than ventrally in the shape of a transverse plate, somewhat tumid at its anterior margin where it is also indented slightly in the dorsal line: it is not very much shorter than segment 12 but is inclined to the longitudinal axis of the pupa at a greater angle than 12 or 14; segment 11 is very nearly double the length of 13 (or 12) and has the front margin bevelled longly though the bevil-surface is only little inclined to the longitudinal axis, but it is characterised by being unusually sculptured; the bevil-surface is transversely finely but conspicuously parallel-ridged by twelve separate ridges running from the spiracular region on one side to that on the other, this surface thus is broadest in the dorsal region; segments 10 and 9 are about the same length as 11 and have the front bevils exactly similar; the hinder bevils of 8, 9, 10 are equal in length to these front bevils and similarly inclined but are perfectly smooth, somewhat dull, membranous; the anterior bevils of 11, 10 and 9 are sharply separated from the hinder horizontal segment-surface by a raised, thin ridge—the hindermost of the parallel series characterising them; also: the amount of dorsal, horizontal segment-surface left between the hinder and front bevils on each segment is very narrow, about half only of the length of one of the bevils; segment 8 is longer somewhat than 9, the bevils all included in both cases; segment 7 is nearly as long as 8+its bevil and 6 is practically the same; 5 is equal to 4, both about half 7; the thorax is equal in length to 5+6+7 together and about equal to the breadth of the pupa at shoulders, its hinder margin is a strong curve nearing a quarter-circle, the curve meeting the wing-line which curves towards it in a deep, angularly-rounded angle of 90°, the front margin is perfectly and evenly transverse-straight, the thorax is highest about middle, its anterior slope about 30° inclination to the longitudinal axis of the body; segment 2 is about one-fourth the length of thorax, about equal to one and a half times 4, has its front margin straight and is in the same plane as the front slope of thorax; *head* has the vertex (counted as far as the knob on frons) slightly longer than segment 2 with the inclination forwards perhaps slightly steeper than that of 2; the frons is, as stated before, slightly prominent and has a still more prominent, rugose-surfaced, upturned knob in its middle and the whole frons, taken as a separate piece, is in a plane perpendicular to the axis of pupa; the clypeus follows at the ventral base of frons, is of quite a respectable size, rather smaller than the spiracle-patch of segment 2, trapezoidal-shaped, narrowing, strongly and incurvedly, distad; the ligula quite ventral, long-diamond-shaped, as long as clypeus but much narrower; eyes prominent, semi-circular, the surface rugose with the crescent medial, broad and very highly-polished; proboscis reaching to cremaster, free beyond the wings; forelegs reach half the length of wings, the mid legs about two-thirds, the antennæ just beyond mid legs, all these acutely pointed at extremities. *Surface* of pupa is shining and covered with short, golden hair except on wings, eye-crescent, legs, antennæ and proboscis, this hair not much longer than a spiracle-length anywhere, a

fringe of single hairs overhanging hinder bevels of 8, 9, 10, slight tufts on abdominal segment ventrally on each side of extended proboscis; otherwise the hairs sparse, in no wise hiding the colour, sculpture or anything else of pupa; the wings very shallowly, obscurely transverse-corrugate, the antennæ cross-ridged besides; head obscurely confused-corrugate with eyes rugose and also knob; segment 2, thorax and rest pitted in a pin-prick manner, each pit bearing one of the little hairs mentioned; segments all well defined, the hinder margins of 5, 6, 7 slightly tumid; the whole wings also slightly tumid. *Spiracles* of segment 2 are mere slits with a large, three-quarter-circle-shaped, brown-golden (according to lights) patch behind each on the surface of the thorax; this patch slightly raised, disc-like, along its margin, facing out and forwards, very shallowly funnel-like sloping to the slits: it is as long as well over half the length of segment 2 and very nearly as broad; the other spiracles small, about as long as one-seventh a segment-length or one-eighth, oval, twice as long as broad, very slightly raised, whitish. *Colour* of the pupa is a rather bright golden-rusty on wings and head, 2 and thorax, the abdomen lighter somewhat with the front bevels redder as well as the cremaster. L. 23 mm; B. 6 at middle, very slightly less at shoulders, slightly over 4 mm across eyes; cremaster about 1.25 mm, the head-knob much less.

Habits.—The eggs of this Skipper are nearly invariably laid upon the uppersides of leaves and generally towards the top of the plant, otherwise upon the tenderer ones; rarely, by mistake probably, an egg may be deposited upon an under surface. The place chosen is invariably somewhere in the open; the plants must be exposed to the open sky as, apparently, the sun is a necessity; this conclusion being confirmed by the fact that no caterpillars are ever found during the heavy rain months in Kanara when there is practically no sunshine for more than a few hours at a stretch. The butterfly is never seen on the sea-coast itself although, in the immediate vicinity, within two or three miles, on the hills at 1,500', it is always in evidence during the drier, sunnier weather in October and thenceforward until the next June and the break of the monsoon. So its habitat is evidently limited by both height and absence of heavy cover. The larva is always sluggish, lies hidden during the day in a cell made out of a triangular portion of the leaf cut from the edge and turned over on to the top surface and there fastened down firmly all round with plenty of silk, lined thickly inside with the same material and evidently meant to last for some time. And it does last too for several stages of larval growth; it is used until the caterpillars positively can no longer fit into it. Another similar cell is then made. The little larva when it comes out of the egg is black; the whitish, transverse, short lines appear in the second stage. The original cell of the egg-larva may be nearly round; the whole thing being concave inside; later cells are more oblong than those of other species; the entrance is always next the narrow tongue connecting the cover to the leaf and is quite round and open, though only just sufficiently large for egress. Inside the larva lies on the lid or cover with its back downwards and always sits with its head turned round on its side, the body much contracted. It feeds in the early morning and evening and, probably, during the night, wandering in its later stages a little afield to do so but confining itself, in its first stage, to a circumscribed

area near the entrance to the cell. When it is fully fed it turns to a pupa either in the last cell or wanders and makes a new one, often out of withered leaves near the ground or actually on the earth. This last cell it coats all over with silk but rather thinly, fixes a pad for its tail and a band across its middle which is anchored on both sides as well as to the roof. The pupa is attached strongly by the end of the cremaster; it does not seem to emit any sound when disturbed; neither does it move much. The butterfly emerges in the early morning as a rule and after about two months from the deposition of the egg; so that the growth of the larva is very slow. Larvæ of all sizes were found in the beginning of October, some of them in the penultimate stage, and the first butterfly came out on the 30th of November; so that the time would seem to be even longer than two months. The time spent in the pupa is about a month. The butterflies frequent the open places in jungle country, the tops of ridges and hills where the soil is superficial and the rocks crop out being preferred to anything else. They rest on the undersides of leaves, their wings horizontally outspread and, when disturbed, they fly quickly away but return again in a short time to the same perch. They prefer rocks and earthen banks really to leaves as resting places and are more often found sitting on the surface of overhanging boulders on projecting parts of earth-banks, always on the undersides where they are in the shade and not easily seen. The brown colouring of wings and body with the fore wing plentifully spotted with hyaline white windows make a most effective protective pattern against any rock or earth background. Few enemies would spot them resting except that a lizard might see one that happened to settle near its lurking place or a bird that chanced to be near might snap it up; a spider's web might, during flight, enmesh it and lead to its undoing but, otherwise, the insect must be very immune from capture. It generally flies backwards and forwards upon a short, beaten track and takes no prolonged excursions. The females are found flying above the tops of the foodplant in the sun occasionally and individuals may occasionally be seen basking on the upper sides of leaves similarly in the open, but that is not often. They visit flowers, however, but, even then, chiefly such as are amongst herbage under leaves and in the shade; chiefly, also, in the early part of the day round openings in the jungle, by the sides of footpaths and nallas where there are open bits. The foodplant of the larva is *Strobilanthes callosus*, Nees, a gregarious shrub of the hills that forms an undergrowth over patches of jungle sometimes miles in extent on the Western Ghats and elsewhere in South India from the Surat Dangs down. The insect has also been bred on *Dædalacanthus roseus*, T. Anders. and *D. purpurascens*, T. Anders. in Kanara District of the Bombay Presidency. Swinhoe gives the habitat as "South India, Ceylon". He further states that the type came from Maungbhoom in Lower Bengal and that de Nicéville records it from Trichinopoli; that it is a common species in Northern India and he has taken many examples in Mahableshwar, Matheran and in and about Bombay and has it from Kanara; and that Hampson records it from the

Nilgiris, Evans from the Palni Hills. It is quite plentiful both in the Surat Dangs and in Khandesh District. The foodplant is locally known as Karvi in Kanara and there are quite a number of species of *Strobilanthes*. Some of these flower annually, others biennially, some every three years and others again only every five or every seven years when the plants die down completely. The flowers are large and conspicuous along the stems and are white, mauve, blue, or rose-coloured. There is no mistaking the plant when it is in flower.

193. *Celænorhynchus leucocera*, (Kollar).—Male. *Upperside*: dark, blackish-brown, the basal area of both wings clothed with greenish-ochreous hairs. Fore wing with three conjoined, semi-hyaline, white, subapical small spots in interspaces 6, 7, 8, with the two similarly small, well-separated spots outwardly below in interspaces 4, 5; a semi-hyaline, white, outwardly oblique discal band, composed of two large, conjoined, sub-quadrate spots, the upper one filling the width of cell near end, with a small spot, sometimes a twin spot, between its upper side and costa; the lower spot, the larger, in interspace 2, protruding outwards, its inner side attached to the outer lower side of the upper; a small, round spot close to its outer, upper corner in interspace 3 with another, slightly larger spot attached to its lower, outer corner in interspace 1 with, sometimes, a very small detached spot inwardly below it. Hind wing: with a medial and discal series of small, orange-ochreous spots, some of the discal series very obscure. *Underside*: paler, markings as on the upperside but there is an extra ochreous, small, round spot in the middle of cell in the hind wing and the hinder marginal space in the fore wing is pale. Antennæ with the shaft and club pure-white above, the tip of the club entirely white; palpi grey, white at the sides and also below the eyes; head, body above and below and the legs concolorous with the wings; abdomen beneath with whitish segmental bands. Cilia of fore wing brown basally, white outwardly with small brown patches at the vein-ends; of hind wing, checkered brown and white.—*Female*. Like the male on both sides, the two large spots of the discal band of the fore wing a little disconnected. Antennæ black, the tip with a white stripe on the underside. Cilia alternately white and brown.

The above is nearly word for word taken from Swinhoe's *Lepidoptera Indica* and was written comparing fresh specimens detail for detail. In all the Kanara specimens the small spot, sometimes a twin spot, on the fore wing above the large upper discal one is ochreous. On the hind wing there is always a basal series as well of indistinct ochreous spots. The hairs on the basal area of fore wing are all short, decumbent, bright ochreous; those on the hind wing are longer, much longer, ochreous and brown and extend all along abdominal area and right out to middle of disc; the inner margin of fore wing is fringed with hairs. The cilia of fore wing are all brown with a grey tinge only towards tornal angle. Expanse up to 50 mm.

It is a fact that these butterflies vary somewhat with the season both in the depth of the colour and in the clearness of the markings of the hind wing. It is a matter of food chiefly, the succulent, young leaves producing quicker growth resulting generally in smaller size on the whole and deeper colouring. The *Acanthaceæ* are practically all herbs or herb-like bushes that have definite seasons of extremely vigorous sprouting and growth with a leafless off-period when many of them die down altogether leaving a few individuals that retain their leaves in the damper situations, but, in that case, the foliage is comparatively

hard and juiceless. From this it happens that the butterflies that are produced in the monsoon months beginning with the early showers of May in Kanara are always small in size and dark with the markings blurred or rather small. Towards the end of the monsoon, getting on for the cold weather the rain stops, no new shoots or leaves are produced and the larvæ take longer to reach their full size and maturity; resulting in imagines (perfect insects—butterflies) larger, lighter in colour and with larger hyaline markings and brighter spots. The cold weather caterpillar is, of course, as a rule, also larger too, although this is not so noticeable. Thus it happens that, in these *Celænorrhinus*, the slow-growing larva produces a larger perfect insect very much lighter in tone of colour and with more ochreous markings on the hind wings. A starved larva of the monsoon season can, with care, be so reduced in size that the resulting butterfly will have some of the small hyaline spots absolutely undeveloped, the larger ones much reduced in size, the markings of the hind wings practically wanting altogether. If due care is not taken to give the caterpillar just enough food it will either die, refuse to pupate properly or produce a deformed butterfly.

Egg.—This is dome shaped like the others, the base only 0·75 mm in diameter, greenish in colour with a shining surface that is sculptured with exceedingly fine low meridional ribs from base to top where they lose themselves, some losing themselves before that by anastomosing with others; there are from 56 to 60 of these ribs and the surface between them is extremely minutely cellular in appearance. B : 1·3 mm. ; H : 0·9 mm.

The cells are hexagonal, widely flat-bottomed, the bottoms pitted, the diameter of cells 0·05 mm, the walls one-sixth of it; 0·9 mm. circular space on top without ribs, cellular only, 0·2 mm. in the middle of that again merely pitted—the micropyle-area or surface.

Larva.—Is very like that of *C. area*. in the shape and in the colouring and marking. The anal flap here is parabolic in shape, rather thickened round the margin and tending to truncation at the extremity, the surface very rough in the end three quarters with the minute, star-topped hairs which are here thickly disposed, the little pittings from which they rise (it is difficult to say whether they are pits or dots) dark brown in colour but very minute; segment 13 a short segment with waved margins, about $\frac{1}{3}$ rd the length of segment 12 or 14; segment 12 shorter than segment 11. Segment 2 smooth and opaquely greenish white, shining, for half its length behind from margin, this portion bordered behind by a black line or dark-brown line with a little subdorsal brown dot in front of it. The *head* is the same shape as that of *C. area*. and has the same sculpture but there are no appressed hairs as in that species; the colour here is also nearly black (very dark red-brown really), the labrum is the same colour as the rest and the ligula is lighter and glassy; the eyes are dark except the first (from top) and the last within the curve; the true clypeus is triangular and acute-apexed, the false clypeus (not visible in *area*) outside it is also triangular, the apex acute, the sides minutely waved, reaching the upper border of the face. The *spiracles* are small, slightly raised, white ovals, that of segment 12 and that of segment 2 larger. *Surface* of larva nearly dull, the skin translucent showing all the tracheæ through, covered with tiny little star-topped or thick-topped, white hairs all over which are, if anything, shorter than those in *area*, about equally densely disposed. *Colour* is a darker olive green than in *C. area* with a similar narrow dorsolateral and spiracular greenish-white band from end

to end; all hairs rising from minute white dots below the dorsolateral band but not above; legs, or legs and belly greenish but lighter than dorsal parts. L: 29 mm when at rest with segments contracted; B: 6 mm. There is a dark, dorsal, pulsating line.

The larva would be 35 mm easily when moving and stretched a bit and is uniformly larger than that of *C. area*.

Pupa.—The pupa is of similar shape to that of *C. area* but is longer and slighter compared to the breadth and is always golden red-brown in colour with the proboscis free from the end of the wings to often a bit beyond the very extremity of the cremaster (end of the pupa altogether). The pupa is thickest at middle, thinning slightly to the shoulders whence it decreases more rapidly, but gradually, to the head (instead of suddenly as in *area*), the head forming a transverse piece with parallel sides and a longer front which would be straight except for the frons being prominently rounded with a hemispherical, very bluntly pointed knob on its apex, this knob pointing up and forwards and being quite short, the eyes are large and prominent laterally as usual; the head-vertex, segment 2 and the front slope of thorax are all in the same plane which is inclined at about 30° to the longitudinal axis, segment 2 is a short segment, both its margins parallel to each other and, therefore, straight; thorax not long, not much humped, its hinder half slightly descending to hinder margin (very nearly parallel to longitudinal axis really), the hinder margin a semicircular curve (but slightly narrowed in apical part) meeting the wings in a very widely rounded angle of something less than 90°. The cremastral segment is a strong, down-curved triangular piece, broad at the base, narrowing towards the end where the sides are parallel for a bit and then diverge again shortly before the extremity which is slightly thickened and along which are arranged the tiny suspensory hooklets rather densely; this cremaster has the extensor ridges along its borders prominent and bent down along the hinder margin laterally, the dorsal part being thus depressed, the whole segment separated from the very short, slightly swollen segment 13; ventrally the extensor ridges run back and down into the ventral, thick base of the segment where they curve widely round to include the anal clasper-scars. Segment 12 is only slightly shorter than segment 11. *Surface* of the pupa is shining and punctate minutely and somewhat distantly on the first three segments, minutely tuberculate (each tubercle bearing a short, red hair) on the abdominal segments where the hinder margins of segments 8 to 10 are broadly less shiny and smooth and gently bevelled, the opposing segment margins of 9 to 11 broadly also gently bevelled and minutely regularly lined or ridged parallel to the segment margins; segment 4 has a smooth space in centre and the wings are irregularly aciculate-wrinkled; each tubercle is surmounted by an erect, brown, fine hair; the eyes are rugose and hirsute; the wings have no hair on them; the proboscis reaches slightly beyond the pupal end and is gently in-curved throughout its length. The *spiracles* of segment 2 are indicated by a large, ear-shaped, thickened surface lying on the anterior part of segment 3, slightly free from the surface along its curved hinder margin, gently shelving towards the margin along its whole length, about $\frac{1}{4}$ the length of the whole margin, golden-plush in colour, bounded along the margin by a slightly raised, very much darker ridge; the other spiracles raised slightly, the colour of pupal surface where they are situated, with thin, central, white, oval slits or centres; not large. *Colour* of pupa is a rather light golden red-brown, darker on wings and first three segments and on cremastral segment, the veins of wings light. L: 24 mm. B: 6 mm.

The proboscis is not included in the above length; it would make the length about 26 mm if it were. In lateral outline there is a gentle gradual constriction between centre of pupal length and the shoulders.

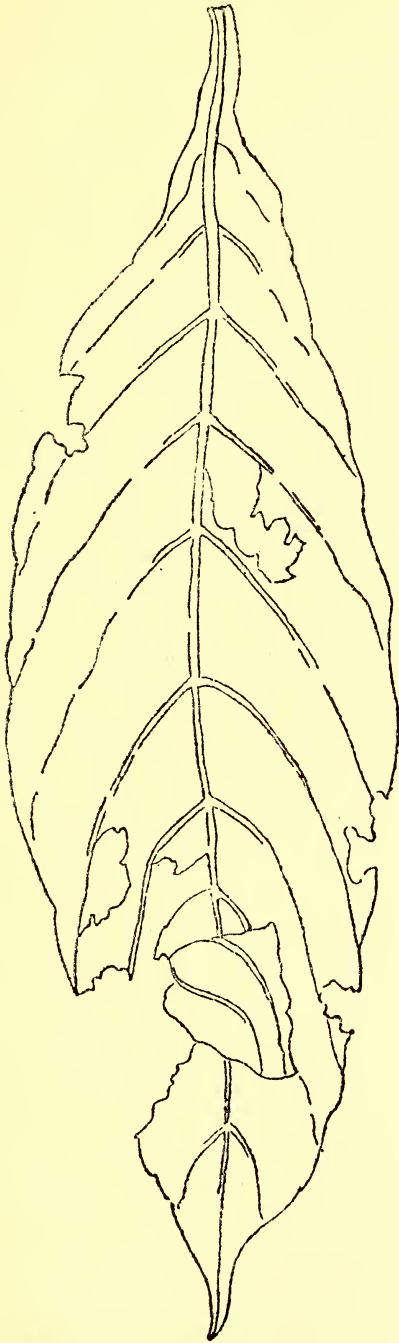


Fig. 1.—*Celaenorrhinus leucocera* :
cell of Larva.

Habits.—The egg is laid on the top or bottom of the leaf indifferently. The habits of the larva are the same as for *C. area* though the caterpillar is much more sluggish than that of that species ; it makes its cell in the same way (see marginal figure), lies in the same way with its head turned round on its side ; and lives, even when full grown, in a cell formed by a three-cornered bit of leaf turned over on to the top surface, the attachment of this cover being a quite thin strip and the inside is carpeted top and bottom with silk, rather irregular as to thickness. The imago rests with wide spread wings on the underside of leaves and is fond of shady places. It has a quick flight. The rather large, white spots on the fore wing against the black ground-colour show up wonderfully well in the shady jungles and help recognition. The ordinary foodplant of the larva is *Dædalacanthus roseus*, T. Anders. ; others *Ecbolium Linneanum*, Kurz and *Strobilanthes callosus*, Nees (*Acanthaceæ*), a very common under shrub throughout the Western Ghats. Swinhoe gives the habitat of this species as India and Burma. Fairly common all over India in the hill ranges ; Elwes records it from the Karen Hills, Elwes and deNicéville from Tavoy ; Davidson, Bell and Aitken bred it at Karwar ; Hampson

records it from the Nilgiris ; we have it also from Kulu, Sikkim and the Khasia Hills. Our description and figures are from Kulu'' (Swinhoe, *Lepidoptera Indica*, vol. x, p. 14). Davidson and Bell caught many specimens, in the Sind Valley, Kashmir at a place called Gund.

200. *Celænorrhinus area*, (Plötz).—Male. *Upperside*: dark olive brown with ochreous setæ on the base of fore wing and brown and ochreous hairs on base of hind wing and along abdominal area. Fore wing with the usual five small, subapical, semihyaline dots or spots, the upper three joined together, the lower two—generally there is only one—minute ; the discal, semihyaline, outwardly-oblique band commencing with a small white spot on costa a little beyond the middle attached to a moderately-large, subquadrate spot with its outer edge indented, a well-separated, similar spot or patch in interspace 2, a small round spot attached to its upper, outer corner and another close to its outer, lower corner, this last nearly always absent in the male ; there is a largish spot towards middle of wing above the inner margin that is blacker than the ground colour. Hind wing.—Without markings. Cilia of both wings alternately black and white. *Underside*: as on the upperside, the entire surface of both fore and hind wings covered with minute, ochreous-grey scales. Antennæ on the underside, with all the club except the tip and the upper third of the shaft, pure white, the remainder of the shaft with pure white dots ; palpi with the inner half ochreous-grey marked with black, the outer or upper half blackish, white at the sides and below the eyes on the head ; body above and below and the legs concolorous with the wings. Female.—Like the male above and below but the spots in the fore wing are larger, the discal band, therefore, rather more continuous, the outer spot usually wedged into the junction of the two large subquadrate spots ; also, on the underside of the hind wing, there is an obscure, whitish dot at the end of the cell. Cilia of both wings as in the male. Expanse up to 50 mm. in the female ; the male somewhat smaller.

The above is again taken from Swinhoe in the *Lepidoptera Indica*. In Kanara specimens there are indistinct white or ochreous markings on the hind wing in both sexes both above and below and obscure blackish spots of rather large size. Also the outer spot between the two large, discal spots is never, in either sex, wedged into the angle between the outer lower corner of the upper and upper corner of the lower on the fore wing. The cilia of the fore wing are not checkered and there is only the greyish bit near tornal angle found in *leucocera*. The female, too, has a very distinct pair of large whitish marks on the underside of fore wing above tornal angle which is also traceable in males. The abdomen in both sexes is transversely banded with intersegmental, white bands. In Swinhoe's picture of the species he shows the fore wings quite correctly with the cilia uncheckered notwithstanding what he says in the text ; he also shows the abdominal ventral intersegmental bands. Indeed the only difference between Kanara specimens and his *figures* (not the text description) is that in them the undersides—and uppersides too as far as that goes, in consequence—of the hind wings are quite unmarked. In the Kanara insect there is always an indistinct ochreous cell spot and submarginal series of spots which are always more distinct on the underside, especially in the female where they are sometimes quite well defined and rather bright ochreous, being always greyish in the male and not so clear.

Egg.—Is dome-shaped, slightly constricted at base where the diameter is 0.09 mm. increasing about half way up to 1 mm. ; the top is somewhat flattened, circularly, in a space with a diameter of 0.15 mm. : the micropyle situated in the middle of it. Surface shining, minutely pitted and sculptured with 47 or 48 fine, low, minutely-beaded, meridional ribs from base to summit but, on the micropyle-surface, they disintegrate into a fine net-work. Colour greenish white with the micropyle-surface a little darker. B: 1 mm. ; H. 0.7 mm. ; the ribs are 0.05 mm. apart in the middle and about 0.02 mm. in width. Only about forty to fifty eggs are laid apparently.

Larva.—The larva is circular in transverse section, thickest in middle, fining down to each end, the anal flap rather longly semielliptical in shape or rather parabolical and long, overreaching the anal prolegs and generally free of the surface of the leaf, its dorsal slope slightly inclined to longitudinal axis of larva ; segment 13 longest in the dorsal line, shorter towards the lateral region, only about $\frac{1}{3}$ the length of segment 12 ; segment 2 narrow compared to the head which is large and nearly square though curving in towards mouth-cavity, deeply indented on vertex in the dorsal line, the bilobation thus produced being wide and triangular, the lobes being pronounced, the vertex of each being evenly and narrowly rounded but not in the least pointed ; the clypeus is triangular, the apex acute situated about the middle of the face ; the eyes are four in an even curve, the sixth more widely separated (the four are at equal distances from each other) and slightly displaced inwards, the fifth right inside the curve towards its centre ; the surface is irregularly honeycombed-rugose, covered with short, appressed, light hairs giving it a silky appearance though these hairs are quite widely separated enough to in no way obscure the surface-sculpture ; the surface is shining ; the colour is rather dark, bright red-brown ; the labrum slightly lighter, the ligula small, of the same colour as head as well as the basal joint of antennæ, the second antennal joint lighter with a dark tip ; the mandibles dark brown as well as the eyes. The *surface* of body is dull, the skin transparent-looking and covered with minute, erect, white hairs all over fairly thickly, each hair being bi or trifurcated starwise at the end ; these hairs longest on the anal segment-margin ; the segments thinly creased parallel to the hinder margins for a short distance forwards and parallel to these margins. The *spiracles* whitish or very slightly soiled-whitish, oval, very slightly prominent and rather small ; those of segments 2, 12 larger. The *colour* is an olive-green, very light in shade, more green than olive with a thin white spiracular and dorsolateral, white band from end to end ; the hairy true legs and prolegs green ; the ventrum green. L : 31 mm. ; B : 5.5 mm. at middle.

Segment 2 is glassy-smooth for more than half the length from front margin, the glassy space being separated from the posterior portion of the segment by a brownish, thin line. The egg-larva is very dusky in colour, often blackish with blackish head that is distinctly lobed.

Pupa.—The pupa is more or less circular in transverse section from segment 4 to 13, the thorax being considerably humped, the section is oval in that region, slightly flattened on ventrum, at segment 1 and 2 the section would be transversely oval ; the *shape* is pointed at anal end, squarely blunt at front end except for the frontal, round-topped, short, conical prominence ; the pupa is perhaps broadest at the slightly roundly prominent shoulders but very little broader than at middle, between which and the shoulders there is a gradually curved slight constriction ; segments 1 and 2 (the piece composing these) is suddenly narrower than the pupa at shoulders and is nearly square, the ventrum parallel to, the dorsum inclined at an angle of 40° to the longitudinal axis, the head-vertex being in that line, the frons perpendicular to the axis and its whole width included in the base of a conical, frontal, short, round-topped prominence from between the eyes forwards ; segment 2 is a narrow, parallel-sided piece, the thorax is long, prominent, highest at middle (which is

the highest part of pupa) with the hinder margin a short, parabolic curve meeting the wings in a very widely rounded angle of less than 90° . The proboscis is free from the end of wings to the base of cremaster; the cremastral segment has a short, transverse base from the end of which proceeds the cremaster, triangular, long, slightly down-bent, with strong extensor ridges bordering it dorsally, the space between depressed; ventrally also there are these ridges, but shorter before diverging in wide curves to embrace the scars of the anal prolegs. The spiracles of segment 2 are indicated by, each, a small, ear-like excrescence of parabolic shape, slightly longer than broad at base, lying from the common margin of segments 2 and 3, back on segment 3 from which its posterior margins stand quite free though only slightly; the other spiracles small, rather narrowly oval; white and slightly prominent. The surface of the pupa is shiny and covered, like the larva, with similar hairs which are only visible under the lens and are densest and longest on head: on the eyes and prominence. The colour is grass green, very glassy-shining on thorax, lighter green on head, opaquer yellowish green on abdomen; the wings light green, cremaster glassy whitish green. L: 17 mm.; B: 4.5 mm.

Habits.—The larva, after emerging from the egg, the shell of which it eats, makes a little cell on the upper surface of the young leaf by turning over a tiny triangular portion which it fixes down with silks, lining the inside with silk; this process is repeated as it grows, the cell being renewed of a larger size on new leaves; when full grown it places one leaf over the other and fastens them, lying between. It pupates in such a cell or in a dead leaf which withers and falls to the surface of the ground if not already there. The imago comes out in the usual time, about 7 days. The larva dislikes the light and is found on bushes under the shade of other trees in retired places where the air is not too dry. Here in Karwar they are mostly found in semi-evergreen jungles. The pupa is strongly attached by the tail and a body-band made in the usual way. The eggs are laid single and on the top of the leaf, young ones being nearly always chosen. The larva, when touched, raises its head over its back and opens its jaws; it often lies with its head turned round on its side in the cell. The butterfly is very common in the Kanara District of Bombay where it is found in company with *C. leucocera* and is just as numerous in individuals. It has exactly the same habits. The foodplant of the larva is also the same, *Strobilanthes callosus*, Nees, (*Acanthaceæ*). The insect can, Colonel Swinhoe states, readily be separated from *C. spilothyryus*, (Felder) by its checkered *cilia* and he confines it altogether to South India giving Lanaoli, Mahableshtar, the Palni and Nilgiri hills as localities of capture. He says the type came from Calcutta. It will be seen, however, by what is written above, that the Kanara species has got the fore wing with the *cilia* uncheckered as in *spilothyryus* and has also, in the female, the pale spots on the underside of fore wing above tornal angle of that species (although here they are white instead of ochereous).

Genus 2.—DAIMIO.

Antennæ.—With a moderately formed club, bent over at about a right angle to shaft.

Palpi.—Porrect, third joint short, obtusely conical.

Hind tibiæ.—With two pairs of spurs, a tuft of hairs attached to its proximal end.

Fore wing.—Vein 12 ends on the costa before end of cell; discocellulars suberect; vein 3 emitted a little before lower end of cell; 2 about one-fourth from base; cell less than two-thirds length of costa; costa evenly arched, outer margin oblique and convex about middle, apex subacute, hinder angle angular, hinder margin straight.

Hind wing.—Vein 7 from a little before upper end of cell; the discocellulars very faint and nearly erect; 5 hardly visible; 3 from a short distance before lower end of cell, 2 from one-third before end; costa highly arched at base, apex rounded, outer margin somewhat sinuous.

General colouring.—Black to blackish-brown, sometimes greyish with a broad, white, oblique, discal band bordered by black spots across both wings." (Swinhoe in *Lepidoptera Indica*, vol. x, p. 29).

201. Daimio milliana, Swinh.—Male. *Upperside*: Fore wing. Dark brownish-grey; five subapical, semihyaline, white spots, the upper four in an outwardly oblique curve from near costa and very close to each other, the fifth, inwardly below the fourth and a little separated from it; a central band of large, semihyaline, white spots, the upper one at the end of the cell, its outer side rounded, its inner side concave; a similar-sized, quadrate spot below it in interspace 2 before its middle, its inner, upper end nearly touching the lower, inner end of cell-spot; a larger, quadrate spot attached to its lower side extending half inwards and expanding somewhat on the hinder margin; with two prominent black spots, one above the other, on each side of this spot, the outer pair well within the white; a small subquadrate spot close to the base of interspace 3 outside but close to the junction of the two upper spots. Hind wing. With the base narrowly, the outer margin broadly, brownish-grey; the rest of the wing pure-white; a continuous whorl all round the wing, from base to abdominal fold, of black spots, one below the costa within the white space, the others on the inner edges of the basal and outer marginal bands, the upper four annular, the others linear; a smaller, black spot at lower end of cell. Cilia of both wings brownish-grey. *Underside* similar, the black spots, very prominent. Antennæ brown with the upper half of the club white; palpi with bright-ochreous hairs; top of head similarly coloured; thorax with some white hairs; abdomen with the base and tip brownish-grey, the middle portion white; on the underside: thorax with white hairs, the abdomen entirely white. Female.—Similar to male.

In the wet-season brood the male has both sides much darker than in the dry-season form (that described above) with the markings similar, the subapical spots in the fore wing larger and somewhat elongated. Expanse 45 mm.

Habitat.—Burma, Types in the B. M.

There are several examples of both sexes in the B. M. from the Shan States, Tilin Yaw and Pegu.

The above is taken from Swinhoe in *Lepidoptera Indica*, vol. x, p. 34, and it is curious that a single example of the insect should have been caught with a net in Kanara many years ago—in the mid 90s—on the crest of the Western Ghats in Kanara at a place of the name of Anshi in January '98. It looked like a moth, fluttering past overhead in the manner of a hypsid or zygænid. No others have ever come to notice and it is fairly certain none have been captured. The specimen was practically perfect except for a small chip out of one of the wings and was a female. It agrees in every detail with the above description. The top of the head, the collar, the palpi except the small third joint which

is black and the pectus are bright ochreous—nearly orange but of a light shade; the legs are all quite brown. The expanse is only 1·5 inch or 38 mm. At the time of capture we thought it was *Satarupa bhagava*, an insect of N. E. Bengal, Ranikhet, Sikkim, the Kasias to Burma. Colonel Swinhoe says that Betham caught *bhagava* in the Central Provinces. It would, therefore, be interesting to know whether Betham diagnosed *his* insect correctly or not.

Genus 3.—TAGIADES.

Antennæ.—With a slender club, the terminal portion rather long and bent at about a right angle.

Palpi.—Porrect, the third joint minute.

Hind tibiae.—With two pairs of spurs and fringed.

Fore wing.—Vein 12 ending on costa well before the end of the cell; discocellulars suberect, the lower the longer; vein 3 from one-fifth before lower end of cell, 2 from one-fourth from the base, the median vein strongly arched between bases of 2 and 3; cell less than two-thirds length of costa; costa arched, apex angular with outer margin convex, hinder angle obtuse and hinder margin nearly straight.

Hind wing.—Vein 7 from one-fifth before upper end of cell; discocellulars and vein 5 very faint; vein 3 from before lower end of cell, 2 at about one-third before end; wing evenly rounded.

Quoted from Colonel Swinhoe in *Lepidoptera Indica*. He further divides the genus into two groups which he calls the *Japetus Group* and the *Menaka Group*. For present purposes they might be called the *Obscurus Group* and the *Litigiosa Group*; in the former the underside of hind wings bluish-white, the upperside with a narrow white or bluish-white border; in the latter with the undersides pure white or orange on outer half of hind wing with black spots on the white. The fore wings in both are blackish with hyaline spots.

Egg.—Dome shaped. Surface ribbed fairly coarsely from base up to near apex; the height being to the breadth in the proportion of about 1 to 7. The colour is red or brown and the eggs are covered with wavy, curled hairs from the abdomen of the butterfly. They are always laid on the top of the leaf.

Larva.—Fat, stoutest about segments 5, 6; the neck much narrower, the head very large compared to it, semicircular, the base being across the vertex where it is widely, curvedly emarginate dividing it into widely-separated, short though well-formed lobe-points that are, however, quite blunt. The anal end flattened, broad, rounded, the flap overreaching the anal clasper-bases; the surface of body clothed all over with extremely minute branched hairs visible only under a powerful lens. The larva lies with the ventrum appressed to surface. It is some shade of olive-green, the skin thin and without longitudinal lines; the head either black or dull orange.

Pupa.—Fairly stout with the shoulders rounded and about as broad at shoulders as at middle; the front square, broad, segment 2 and head in a plane more or less perpendicular to the longitudinal axis of the pupa, the frons with a short, stout process; the spiracles of segment 2 with prominent spiracular processes; the anal end with the cremaster well-formed, bent down somewhat, its extensor-ridges well-formed; the proboscis produced shortly beyond ends of wings; the colour light green or sullied greyish with large, enamel-white triangles laterally or with blackish dots.

Habits.—As said above, the eggs are laid singly on the tops of the leaves, a young one being always chosen. The egg-larva comes out by a hole eaten through the top and wanders a bit before going to the part of the leaf where the cell is to be made. This is a nearly always a broad-triangular piece cut from the edge and turned over on to the top where it is fastened down lightly by a corner, a hinge being left to keep connection with the leaf-surface, this hinge thin and including a veinlet to strengthen it. The mouth of cell or hole of ingress and egress at the hinge. Inside this "lid" lined with a carpet of silk upon which the larva lies back downwards towards the main leaf-surface. This method continued through life, a new and larger cell being made as required; finally a large oval bit is turned over, always lightly fixed down by a silk or two, never all round: and the edge of the lid is scalloped along both edges rather largely. The larvæ sometimes lie over for months after finishing feeding. They often pupate within the cell last inhabited. The pupa has a strong tail-attachment and a loose body-band attached to the lid by a rope of silk—it lies with the back towards the lid, not the other way up as the larva does. The butterflies inhabit forest countries where the vegetation is damp, generally in the hills and fly about in the underwood or near the ground in shady places. They rest on the undersides of leaves and return to the same leaf, never flying far or for long. The flight is very quick, in jerks, up and down. The larvæ feed upon *Dioscoraceæ* or Yams which are supposed to be monocotyledonous botanically.

202. *Tagiades litigiosa*, Möschler.—Male. *Upperside*: quite black; fading, however, after some months to dark-brown with the basal half of fore wing patchily darker; inner margin of both wings shortly fringed with hair which is black on fore wing; white on hind wing, the latter wing with longer hair on inner half of disc from base, brown at base, white beyond; the hind wing largely white in outer two-thirds. Fore wing. Five small (about 0.5 mm in diameter) semihyaline spots from near costa before apex in interspaces 4 to 8, the third in 6 outwards with the fourth and fifth in a strong outward curve; another further in near base of interspace 3 with a seventh inwards and not far off in the upper part of interspace 2; a spot in the upper part of end of cell with a subcostal spot above it and, finally, one in the bottom of end of cell near the origin of vein 5 that is not always there; the cell and basal third of wing below vein 2 is very obscurely darker than the ground-colour even in the fresh, black specimens where also a blackish spot at the base of interspace 2 and a discal series of black spots can be made out. The hind wing. The basal third black, this black running broadly round the apex to the middle of the outer margin after which it is continued as large subterminal, black spots four in number at the end of veins 4, 3, 2 and 1; two black spots, very obscure, embedded in the outer margin of the black, basal space and two more in the inner margin of the black, apical band, these latter two sometimes quite well-defined although never disconnected from the band; the four submarginal black spots in continuation of these two subapical ones are sometimes disconnected, at other times more or less confluent. The cilia are white on the white portion of hind wing, black elsewhere on both wings except for a white shade above ternal angle of forewing. *Underside*: with the fore wing paler but otherwise the same as upperside. Hind wing.

As on upperside but with the black replaced by light blue suffusion below the costal black band; the black spot in upper part much more distinct. Female—Similar to the male but the black spots on hind wing larger, the two on the inner side of the black, apical band not altogether included in that band. Antennæ black, the end of club above pinkish, below white extending on to the upper part of the shaft; palpi white below, blue in certain lights at end of white, black at ends and on top; head black with white at front bases of antennæ; body and basal half of abdomen black, the distal half of abdomen and whole of under-side and legs white. Expanse 40 mm.

Egg.—The egg is dome-shaped. The surface sculptured with 12 or 13 meridional ribs from base up, ending near the top; these ribs about 0.05 mm in thickness by rather less in height; the intervals between them 0.15 mm, not including any part of any rib; the general surface apparently minutely rugose, only moderately shining but so covered over with a sort of dirty-white, cerous (?) matter as to nearly obscure it—it looks like a minute moss: the top of the egg is bare of ribs in a circular space of 0.5 mm diameter, the ribs ending abruptly on its circumference, truncatedly; this bare surface slightly convex, minutely, superficially cellular. The colour is, as far as ascertainable, a sort of light chocolate or medium brown. B: 0.9 mm; H: 0.65 mm.

Larva.—Pl. II, fig. 30.—The body is limaciform in shape, fattest in the middle, (7 mm) fining gently backwards to segment 9, more rapidly afterwards to become 3.5 mm at the anterior margin of segment 14; forwards, at segment 3 the breadth is 5 mm, segment 2 is only 3.5 mm at front margin, the dorsum is convex more or less semicircularly in transverse section from spiracle to spiracle, the complete circle being interrupted from bases of legs and prolegs across ventrum because the body is there considerably flattened; segment 14 is twice the length of 13, segment 13 being about 1.85 mm long; segment 11 is longer, about 2.75 mm; segment 12 equals 13; segment 14 is, therefore, about twice as broad (at front margin) as long: it is semicircular but looks semi-elliptical as it is convex transversely, the inclination of its dorsal line being slight, its edges somewhat thickened and there is a circular patch dorsally taking up the whole width at extreme end and about two-thirds of the length which is defined by a slightly impressed line from the rest of the segment-surface, the texture being also slightly different, the free edge of the segment, the flap that is, overreaches the anal claspers by a distance equalling the length of a clasper; these claspers are very short, their shanks cylindrical, stout, the ancle broadly rounded and hardly distinguishable from the shanks except that it has a fringe of short, light hairs along its base; the prolegs similar to the claspers: they are all light greenish-white; the true legs very short, also with short hairs, whitish; there are some very short, whitish erect hairs also round the free edge of anal flap. The larva is, on the whole, a very fat, ventrally flattened looking thing thinning a good deal at ends; segment 2 is white, shining, the head (see marginal figure)

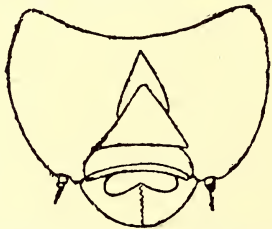


Fig. 2.—Head of *Tagiades atticus*, Müschler.

the labrum, ligula and end of antennal end-joint—others ventrally on palpi,

appearing a good deal broader than it: as a matter of fact the head is only 4 mm broad to the 3.5 mm of segment 2; this head is very widely heart-shaped, the vertex being the broad side, widely and shallowly emarginate in a gentle curve, this emargination affecting upper part of face also leaving each lobe with the apex somewhat conical in appearance and situated as far as possible from the dorsal line and slightly forwards of actual occiput; the surface of head is irregularly, rather coarsely reticulate veined, the veins slightly raised, the whole shining, the only visible hairs being on

&c., none as long as half the true clypeus ; colour of the head is a rather light shining orange with a slight soiled tinge about it ; the true clypeus is an equilateral triangle with absolutely straight sides and perfectly-formed angles, about half the height of face ; the false clypeus starts very thin at base of true clypeus and reaches about one-third of true clypeus higher up face, its sides very slightly outward-curved from about half way up, its apical angle rounded narrowly ; both clypeuses have the surface as for the rest of the head ; the labrum slightly longer than a quarter of the true clypeus, its hinder margin straight, its front margin widely, superficially-emarginate, its width four times its length, and it is chitinized like the head-case and of the same dull-orange colour ; ligula the same length as labrum, not quite as broad, kidney-shaped, the sinus wide, shallow, its angle about 100° or more, triangular ; antennal basal joint whitish the third light-rusty ; mandibles shining black, very prominent and large, strong, the cutting edges, minute-toothed above, entire in the ventral moiety ; eyes arranged : 1 to 4 in a very gentle curve, all equidistant, number 6 four times as far below in a line with 3, 4, number 5 behind, four interspaces from number 6 and three interspaces from 4, all equal in size, all glassy, the pupils black. *Surface* of larva quite smooth, shining, with the segments all well marked but not in the slightest constricted, each segment with four transverse folds parallel to and from hinder margin forwards reaching half the length of segment so that each fold is equal to about one-eighth of a segment-length ; segment 2 quite smooth, white ; the hairs on legs, prolegs, free margin of segment 14 have been mentioned above—and there are others, excessively minute and not visible even except with difficulty under a strong lens in a good light : these hairs arising, one to each, from the yellow dots to be mentioned under "colour." *Spiracles* very small, about twelve to the segment-length, moderately broad ovals, slightly raised, white ; those of segment 12 very slightly larger ; those of segment 2 more than twice the size of the majority. *Colour* of body is whitish with a strong bluish tinge on segments 3, 5, 12, 13, 14 and an equally strong yellow colour on segments 6 to 11 ; the white mainly caused by numerous white dots, the yellow by numerous yellow dots, all these dots bearing each an excessively minute hair ; ventrum is bluish-white with a green tinge ; there is a 2mm. broad greenish, dorsal, pulsating band narrowing backwards, linear on 5, 4 and a pair of small, semicircular, yellow bodies visible at front margin of segment 10, one on each side of the dorsal line, that keep moving away from and towards each other slightly, sometimes quite meeting—these are the testes of the future moth : so this larva is a male. The L: 30 mm when at rest ; B: 7 mm at middle. Head 4 mm in diameter.

Pupa.—Pl. II, fig. 30 a.—This is in *shape* as follows : head quadrate, terminated by a strong conical beak ; thorax moderately convex ; abdomen stoutest in middle, the transverse section circular, ending in a down-curved, moderately-long cremaster ; the whole body robust, slightly constricted at segment 4, about as stout at shoulders as at middle. The *surface* is smooth, pitted all over with little brown-bottomed pits ; segments all well defined. *Spiracles* oval, narrow, yellowish. *Colour* is a very light, translucent-looking green, the dorsal segment-margins edged with brown ; two large enamel-white, triangular, lateral marks on each side : one at the base of wing near the shoulder, the other, the larger of the two, has its apex at the highest point of wing, that is at ternal angle : the bases of these triangular, white marks are in a straight line if produced, distant from the ventral line one-third of the height of body—these triangles are longitudinally longer than transversely ; under the head, ventrally, are two symmetrically-situated, enamel-white patches and there is another triangular, much smaller patch behind the apex of the larger of the two lateral patches. More succinctly ; the white chalk-markings are : one small triangle, its base on hinder margin of segment 7 laterally, its ventral side curving over

spiracle about a spiracle-length over it, reaching front margin where it impinges on wing, its dorsal side running thence diagonally up and backwards to other end of base which is nearly 1.5 mm long; another triangle, ventrally on the wing, one angle in the tornal angle of the same, one side, the posterior, running down and back along the outer margin half way to the apex of wing, the other side, the anterior, reaching nearly half way between base of wing and outer margin on vein 2, the ventral side of triangle parallel to ventral line; a third triangle of which the ventral side starts at base of vein 2 and runs forwards to just short of spiracle of segment 2 along antenna whence the anterior side runs back and up straight for the hinder margin of the thorax but stops half way—these three triangles outlined blackish thinly; the extreme angle of proboscis-base where it extends to eye and fore leg has a small white triangle in it and, finally, the frons under the frontal snout has a small, transverse white diamond on it on the common margin with clypeus, this diamond with both lateral corners connected linearly, shortly, with a much larger transversely-triangular patch that reaches up to the eye-crescent laterally and down inside of eye as far as base of proboscis longitudinally enclosing the clypeus, ligula and a small tubercle on each side of ligula—a little square area the colour of the pupa—on the two lateral sides, and anteriorly; the wings are, otherwise, quite immaculate; clypeus fuscous-brown, the tubercles on each side also, the white bordered black on each side; a fuscous, transverse line or narrow band across head over snout, another parallel across head between antennæ; all segment-margins brown, hinder margin of segments 2 and 10 broadest; a fuscous, dorsal double band on front half of thorax; wing margins between large, white triangular marks fuscous and some fuscous suffusion round margins of triangles: all pittings of surface finely rusty-margined; two fuscous dots on fore and mid tibiæ, discocellulars of wings brownish; a black splash above spiracle of segment 6, four black dots below and four above spiracle of segment 9; a black dorsolateral, central dot on some of the abdominal segments; the snout and eyes have also rusty-brown pits. Often the colour of a pupa, when formed in a cage or glass, is yellowish-white instead of green; it is always shining except on the powder-white, triangular patches. Surface of wings has the legs and other head-parts slightly prominent as well as the veins; every pit bears a tiny hair; there is a tuft of russet hairs where the prolegs have been situated on segments 9 and 10 besides other single hairs of similar size on sides of ventrum; the head, segment 2, thorax and abdomen are all pitted, and there is always a row of these pits along each segment-margin, the membranous hinder bevil-margin of segments 8, 9, 10 is quite smooth and pitless; the eyes are laterally prominent with the eye-crescent shining-glassy and nearly as broad as the antenna. *Spiracles* of segment 2 are indicated by a semicircular smallish sinus on front margin of segment 3 filled with densely-packed hairs, these hairs being longest behind, becoming quite short in front against the hinder margin of 2, the level of tops of these hairs thus sloping from behind forwards and looking like a velvety surface facing forwards: this surface assuming a grey to golden colour according as the light strikes it; the length of these spiracles of segment 2 is rather less than breadth of the adjacent antenna; other spiracles are from one-fourth to one-fifth as long as a segment-length and are four times as long as broad, narrow ovals of a slightly rusty colour with lighter centre, each placed in a very shallow, much broader depression. The *shape* of the pupa is, laterally considered, parallel-sided to shoulders, these a trifle prominent-rounded, the contour parallel-sided again as far as segment 8 after which it narrows very gently up to hinder margin of 10, then much more rapidly cone-wise, to end; dorsally the head-vertex and segment 2 together with front half of thorax rise at an angle of 45° to the longitudinal axis of body, the thorax then much less to become practically parallel to that axis in its posterior third, or sloping very slightly in the opposite direction, the apex of thorax being the highest point; from middle of segment

4 to hinder margin of 10 the dorsum is parallel to axis, afterwards inclined at 45° to cremaster which is down-curved ; the ventral line from snout to cremaster is very little convex ; segment 14 is practically all cremaster, the anterior half triangular, the distal half oblong in continuation, the oblong piece slightly dilated at extremity where it is set with many, densely-packed, minute shafts, all hooked and rusty-coloured : this cremaster twice as long as it is broad at front margin where it is depressed-emarginate triangularly and whitish, smooth, the rest of dorsal surface rusty, pitted : ventrally this cremaster is not hollowed out but segment 14 exists as a short disc, sloping ventrally, bordered by the extensor ridges from cremaster, the interval between them filled up by the scars of the anal claspers divided by an impressed, central line ; segment 13 is dorsally hardly half the length of cremaster, ventrally it is compressed by segment 14 into a linear strip with, in the middle, the rather small, circularly mouth-shaped male-organ tumidity ; segment 12 is a quarter as long again as 13 ; segment 11 very little longer than 12, the front half of it bevelled, its hinder margin very slightly tumid above segment 12 ; segment $10=9$, slightly longer than 11 with front and hinder margins bevelled ; segment 8 again slightly longer ; segment $7=6=14$; segment $5=4$, very little more than half length of 7 ; thorax=segments $5+6+7$ together, convex-tumid with the hinder margin nearly a semicircular curve meeting wings in a broadly-rounded, moderately-deep angle of about 90° ; segment 2 one-third the length of thorax, $4\times$ as broad as long, its anterior margin straight, its hinder margin curved backwards, the two meeting in a point under spiracles of 2 ; head with the vertex+frons twice as long as 2, the frons one-third length of whole, produced out into a short, cylindrical (shortly conical at base of course) beak, this beak perfect, not as long as segment 2, its extremity rounded ; clypeus ventral, just prominent, semicircular, a spiracle-length long by two spiracles wide ; ligula twice the length of clypeus between bases of proboscis-halves, in the form of an hour-glass coming to a point distally ; proboscis overreaches the ends of wings—here it is the hind wings which overreach the fore wings by quite a margin—by a little, the mid legs reach three-quarters the length, antennæ curving round their ends slightly, the fore legs reach to about the middle of wings. L: 19 mm ; B: 5 mm at middle, 4 mm at head.

Habits.—The egg is laid anywhere on the upperside of a young, tender leaf, on the very edge or well in the middle ; the little larva after three or four days, emerges through a hole near the top which it gnaws through from the inside widely and evenly ; it makes its initial meal of egg-shell, very often, however, not finishing it. Then it proceeds to the edge of the leaf and gnaws from it inwards between two nervures and about 4 mm distance until it reaches another nervure where it stops ; then proceeds to the edge again and starts another passage about 4 mm further on which it also gnaws inwards to within about 1 mm of the end of the first ; freeing, thus, a triangular piece of leaf, the apex of which is the narrow 1 mm hinge of the future cell, the



Fig. 3.—Cell of egg-larva of *Tagiades litigiosa*, Möschler.

base being the free edge of the leaf. This triangle it then turns over on to the top of the leaf, attaching it by one of the corners with silks (see marginal figure). It then proceeds to cover the whole bit over with a carpet of silks

which, by contraction, make it concave; upon this "lid" it takes up its abode, lying with its back towards the leaf-surface. The little larva is at first a light orange in colour with a disproportionately large-looking, shining-black, perfectly round head that looks altogether too big for its body; the skin is shining with the segments quite distinct and the transverse folds of the segments indicated but there is no sign of hairs, main ones or otherwise even under a strong $9 \times$ lens. It is about 2.5 mm long, with a diameter of barely 0.5 mm. The colour soon changes to greenish after it commences eating vegetable food. After quitting the egg it often wanders considerably before commencing eating, that is before starting making its first cell; it has a shining-chitinized collar on segment 2, brown and transverse and linear. After it has finished its cell it marks off a small area by gnawing the cuticle of the upperside of the leaf from the hinge in a curve to the edge of leaf some distance beyond the gap left by the inturning of the lid and only feeds upon this area in its first stage. It rapidly increases to about 4 mm in length after a couple of meals. There are a few visible hairs along the dorso-ventral margin of body but they are extremely minute and only discernible against the light. It always returns to the cell after feeding. Sometimes it inhabits the original cell after it has undergone its first change for some time but, before entering upon the second, it invariably makes a larger new house which is much of the same shape. It is rather averse to wandering far from its cell in which it lies during the day time with its head turned round on its side. As it increases in size, it manufactures new cells; when full grown it turns over quite a large longly triangular piece of leaf which, in medium sized ones, often includes the tip and reaches well across the whole length or breadth of the leaf-surface. When touched it will open its jaws in a menacing way, lifting the fore part of the body and raising the head but never appears to actually bite. The larvæ always eat tender leaves at first but do not mind much later on how tough they may be provided they are fresh and green. The stages are of normal duration during the monsoon months when the plants are in full leaf, but, at the end of the rains, when they begin to lose their foliage, it may be otherwise. That may be after the third brood, perhaps even the fourth. Then the caterpillar does not at once change into the pupa after ceasing feeding but lies quiescent in its cell for quite a long period; perhaps even for months. It changes colour, becomes a translucent light-green and awaits its time. It may change its abode even once or twice—it does so as a rule; making new quarters in a withered leaf or some such place. When the time comes the larva becomes a pupa and the butterfly emerges in the orthodox ten days' time! There was a larva on the 14th of November 1890 that was full-grown. It eat sparingly until the 20th of the month and, after that date, it never moved from the cell until it became a pupa on the 10th of January

following. Another larva became quiescent on the 1st of December and had not pupated by the 10th of January. One found outside in the quiescent state on the 25th of November did not pupate until the 10th of February, emerging as a butterfly on the 23rd in the evening. The pupa is formed in the cell and is fastened very strongly by the tail and a body-band; the tail-fastening consists of a very strong, short rope of silk to the middle of which the cremastral hooklets are fixed by screwing motions; the body-band is fastened to the surface of the leaf on both sides of the body and to the roof of the cell by a single thread from its middle straight over the dorsum of the chrysalis: the rope is composed of dozens of threads, the body string of some eight or ten, the ends of all of the single threads being spread out fan-wise in continuation of a net-work of threads carpeting the whole floor. The foodplant of the larva is always a dioscoreaceous plant, family *Dioscoreaceæ* or Yams. They are all climbers, creeping amongst the undergrowth and climbing up stems and tree-trunks. The leaves are mostly heart-shaped with pointed ends and longish stalks, always 3 or 5 nerved from the base. Two of the species are five-digitate. The commonest species in Kanara is *Dioscorea oppositifolia*, L. The flowers are all minute, about one-eighth of an inch in diameter, greenish, inconspicuous. The butterfly is a fast flier with the characteristic flight of a skipper, is generally found in the heavy jungles, flitting backwards and forwards on one beat, the only thing visible being the white hind wings as it goes past; occasionally the attention is attracted to it by the *prrr* of the wings as it goes past the ear. It settles, however, fairly frequently and generally in the same places, on the same leaves, sitting, with the wings horizontally outspread, mostly on the undersides. It visits flowers and also bird-droppings on leaf-surfaces; but it does not bask in sunlight—in fact it avoids the sun, preferring shady places. It is a common species in Kanara from sea-level upwards in the jungles in the monsoon months. The distribution is throughout India, in Ceylon, Burma, Hongkong and Hainan according to Colonel Swinhoe (*Lep. ind.*, vol. x, p. 50). He says:—"A common species; we cannot separate the southern form named *vajuna* by Frühstorfer from the northern examples. We have many examples from the Atarat Valley, Ceylon; Orissa; Kanara; Sikkim; the Khasia Hills and from many other localities; Hannyngham records it from Kumaon, Watson from the Chin Hills and de Rhé-Philippe from Misuri. The type came from Sylhet."

This species was called *atticus* by Butler in his *Cat. Fabr. Lep. B. M.*, p. 283 (1869) and, in consequence, by Moore in 1881 (*Lep. Ceylon*, vol. I., p. 68), by Doherty in 1886 and so on up to the year 1908. It seems to have been named *litigiosa* by Möschler in 1878; Frühstorfer put it down as *menaka litigiosa* in 1910. Swinhoe separated it off as a good species.

There is a black and white representation of the larva and pupa on Plate II, figures 30 (larva) and 30a (pupa) which, although not very good, might serve as a sort of guide.

203- *Tagiades obscurus*, Mabile.—Male. *Upperside*: blackish-brown in fresh specimens, fading to brown, Fore wing. Always with the costa darker to beyond end of cell where it joins a band excurved round end of cell, incurved below it to middle of wing, then straight to inner margin; a large black spot in end of cell and another, subbasal, below vein 1; the outer margin also broadly darker. blacker; three very small, semihyaline, subapical dots in interspaces 6, 7, 8 some of which may be absent; some brown hairs at base and a short fringe along inner margin, also brown. Hind wing. With the base darker as far as near middle of wing, the upper half of outside margin also darker and an indistinct curve of three or four postmedial darker spots showing through from underside; the outside margin in a 2mm. broad band suffused with blue-white as far as half way, or nearly half way, with the cilia white beyond this suffusion, sometimes with only the base of cilia white, the ends brown. Cilia of hind wing as well as fore wing otherwise concolourous with wings, sometimes with the usual light tips above tornal angle of fore wing. *Underside*: paler black or brown. Fore wing. Similar to upper side except that, sometimes, there is an extra semihyaline dot in interspace 4; palest along inner margin below the vein. Hind wing. The costa very broadly brown reaching down to vein 6 on outer margin; the rest of the wing white suffused with blue on base; a black spot in cell, a series of five postdiscal spots in a curve, the first, largest, in the middle of interspace 7 below costa, the others decreasing downwards in interspaces 6, 5, 4 and 3; sometimes the lower ones absent; outer margin with a diffuse, narrow, black, marginal band darkest and thickest towards anal angle. Female.—Similar to male; the bluish-suffused margin on outer margin of hind wing narrower. Antennae black in the female, in the male the club and shaft white below; palpi black above including third joint and tip of second, white below; head also black, the frons narrowly fringed whitish in front up to eyes; abdomen above concolourous with wings, the tip in the male touched by white, in the female with ochreous; underside of body and abdomen pure white as well as legs. Expanse 50 mm, the male always a bit less than the female.

Egg.—Dome-shaped, apex flattened, base shortly constricted with no basal band. Surface moderately shining with from 16-20 thin, meridional ribs, some six reaching micropyle-cell on apex, the others only to within 0.1mm. of it from base; cross-rayed between meridions, rays 0.025mm. apart; micropyle-cell hexagonal, 0.15mm. in diameter, its walls 0.025mm. thick by about half that high; meridions 0.025mm. high, 0.05mm. broad, separated by 0.1 mm. towards apex by 0.175mm. at base. Colour deep maroon-red with the meridions greyish. B: 0.9 mm.; H: 0.65 mm.

Larva.—In *shape* this larva is very like that of *Tagiades litigiosa*. It is, however, larger, the head is, perhaps, not quite so broad compared to the height and is always black instead of yellow; segment 2 is rosey white and the general colour is a kind of neutral greenish olive covered with white dots, the whole with a pinkish tinge; the head is larger (broader and higher) than segment 2: about the same diameter as segment 3; the body is transversely convex, the ventrum flat, the dorsal line gently curved, the slope of segments 11-14 inclined at an angle of less than 25° to the longitudinal axis of the body; segment 12 is about three-quarters the length of segment 11; segment 13 is a narrow, transverse strip not one-third the length of 12; segment 14 is a trapezoidal piece, narrowest at extremity, about as long as segment 12, the extremity faintly convexly curved, the lateral corners rounded with the lateral sides slightly constricted about the middle of segment, the basal half with the dorsal surface even and slightly tumid, the posterior half dented widely

and the extreme margin somewhat linearly thickened; the fattest part of the body is the middle whence it thins to both ends. The *head* is perhaps best described as a short semi-ellipse, the straight base being a line across the mouth-opening under or through the labrum, the apex, widely and deeply emarginate in an evenly curved sinus, leaving each lobe with a prominent, bluntly rounded, gradually-formed, conical point; the surface is shining, covered with a network of thin, raised, somewhat irregular reticulations; no hairs; the true clypeus is triangular, the apex acute, higher than broad somewhat, rather less than half the height of face; the false clypeus reaches nearly two-thirds the height of face, has the apex acute also and is as broad as one-fifth the length of base of true clypeus, becoming, however, rapidly narrower at base; the labrum is a quarter the length of true clypeus and transverse, whitish; the ligula kidney-shaped, as long as labrum, whitish, the sinus shallowly, widely triangular; antennal, basal joints glassy-whitish, others dark; mandibles strong, their cutting edges shortly, coarsely toothed: colour dark; eyes arranged 1, 2, 3, 4 in a slight curve, equal-spaced, 6 in a straight line with 3, 4, three times as far from 4 as 4 from 3; number 5 behind, not as far from 6 as 4 from 6 and somewhat less again from 4, all black in colour; the colour of the whole dark reddish-black. *Surface* of the body is dull, smooth, the segment-margins distinct but thin; segment 2 shining and watery-white with a roseate tinge; the whole body covered with extremely short, moderately sparse, erect, light hairs, only visible under a strong lens; the prolegs are short, the bases thick, the feet circular; the true legs quite well developed. *Spiracles* small, light orange in colour, flush, roundly oval; that of segment 2 more than twice the size of the others; that of segment 12 like the rest but rounder. *Colour* is a light, neutral, greenish olive with a rosey tinge, especially in the contracted parts—when at rest in the front segments; the whole body dotted with white except on immediate dorsum on both sides of a dark, pulsating line; laterally, towards the front margin of segment 10 is a small, short, diagonally-placed orange mark (male organs?) which are visible under the skin; the true legs are yellowish; the pseudo legs are the same colour as the rest of the body. L: 35 mm; B: 5 mm; but the length is somewhat more when really stretched.

Pupa.—Is similar in *shape* to that of *T. litigiosa*: fairly stout, circular in transverse section from shoulders to segment 12, about the same width from shoulders to segment 8 whence it thins to segment 13 which is a short, transverse, well-distinguished piece about half the length of 12 and three-quarters the breadth; the cremaster is Y-shaped, the stem broad, the arms triangular, with the space between them rather shallow: the whole piece easily twice the length of 13, the extremity slightly emarginate, bearing the bunched, suspensory hooklets or short hairs: the segment strongly down-curved; the front of pupa high and square, the vertex and frons in a plane perpendicular to the longitudinal axis of the pupa, the frons of head produced into a prominent, somewhat robust, short, round-topped, cylindrical process or snout which is as long as the distance between its base and the outer margin of the eye; segment 2 is transverse, inclined to the longitudinal axis at a considerable angle, about one-third the length of thorax, the margins slightly waved; the thorax is slightly humped, evenly rounded, the dorsal line nearly parallel to longitudinal axis at hinder margin, this margin shortly and broadly triangularly produced backwards in the dorsal line, meeting the wings in a broadly rounded, moderately deep angle of somewhat less than 90°; segment 4 about the same length as segment 5; segment 5 rather more than half the length of 6=7=8; the highest point of pupa is at the apex of thorax; the shoulders are not prominent. *Surface* dull, covered all over with very distinct, small, shallowly concave, shining, light orange pits in each of which is placed a short, recumbent, light, thin hair; the proboscis is shortly produced over the hinder margin of segment 8. *Spiracles* of segment 2 are large, circular, raised, convex, twice as long

as the rest, spongy looking, light orange-grey in certain lights (these are the spiracular expansions)—and facing slightly forwards ; the rest are oval, flush, yellow, not small. *Colour* is greyish with a brown and pinkish tinge, the pits light orange, a black, subdorsal, central spot on thorax and a lateral one in front of it ; a black dot above each spiracle on abdomen and some more round the spiracles of segments 8-10 ; some brown lines along the dorsal wing-margins and similar lines on the wings themselves ; there is, sometimes, a cerous powdering. L : 20 mm ; B : 6 mm.

Habits.—The habits are very similar to those of *Tagiades litigiosa*. The young egg-larva makes a similar nest of a turned-over piece of leaf and the full-grown larva the same ; it always rests with the head turned round on the side and is very sluggish. The pupa is formed between two leaves or sometimes under the prepared cover, the leaves being held in place by a thread or two of silk like the cover. The stages take the normal time and, as a general rule, so does the pupal state though the larva sometimes lies over for an indeterminate time.

The egg is laid on the upperside of a youngish leaf, though never on a tender one ; each one (they are always laid singly) being covered over more or less with a light covering of fine, curly, soft, grey hairs from the extremity of the abdomen of the female. The little larva eats its way out of the side of the egg and makes its first cell by turning over a small, oblong piece from the edge on to the top of the leaf, forming a short tube by joining the edges and closing up one end. It lies on the underside of the roof with its back towards the surface of the leaf or bottom of tube. It is red in colour at both ends, a kind of neutral tint in the middle and the head is black. It is impatient of light and shakes its head violently, wriggling its body when exposed to it. In the later stages the larva behaves as does that of *Tagiades litigiosa* and makes its cell in a similar way. These larvæ are always found in shady places in the jungles of the Western Ghats in the Kanara District where the rainfall is anything from 100" to 300" and prefers the more or less ever-green stretches. The foodplant is *Dioscorea oppositifolia*, Linn, growing commonly in the underwood in the rains, thence climbing up shrubs and even trees. The eggs are nearly always laid close to the ground or on plants that grow up the faces of rocks. They are also found on *Dioscorea pentaphylla*, Linn., growing in similar places. Both these plants belong to the Yam family and some of the species are cultivated for their tubers which are eaten. The butterflies rest on the undersides of leaves with wings outspread horizontally, the fore wings not covering the hind ones. They fly rapidly and jerkily, erratically backwards and forwards in the underwood, often returning to the same leaf and are very difficult to see. They go somewhat sparingly to flowers but also occasionally to bird-droppings on leaves. The best way to catch them is when settled, but they have to be watched to their sitting places. A short *prrr* from the wings as one flies past the ear is sometimes the first indication of an insect's presence in the jungle, the grey on the hind wings does not show up at all as it does in *T. litigiosa* and a sharp eye

is necessary. The butterfly emerges from the chrysalis in the early morning.

Distribution.—“Southern India, Malay Archipelago, Java. The type was Javan, it is supposed to be in the collection de Perreux, Paris; the figure of *Tagiades athos*, Plötz, is said to be identical with it and Plötz's species cannot be separated from our South Indian examples; we have it from Kolar, Coorg, Karwar and Travancore; Evans records it also from the Palni Hills, Watson from the Chin Hills and Wood-Mason and de Nicéville from Cachar; our description and figures are from Travancore examples.” (Colonel Swinhoe's *Lepidoptera indica*, vol. x, p. 44.)

The butterfly is quite frequently met with in the Kanara District practically from sea-level upwards but is more plentiful in the hills at about 1,500 and higher in the monsoon months. There are two if not three broods then and the only reason why it is not just as common at other times is that the foodplants lose their leaves in the cold weather and do not shoot again until the first rains fall.

(*To be continued.*)